

## **STOCHASTIC RESONANCE EFFECTS IN DIFFUSION THROUGH SIMPLE MODELS OF ION CHANNELS**

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The study of the anomalous diffusion of a particle in one-dimensional channel has been performed both computationally and analytically under the presence of a constant external field. However, these one-dimensional channels also present geometrical disorder (barriers opening and closing periodically). Our study has focused on the effects that the presence of both, external and internal, factors have on the diffusion coefficient of the particles. As a result, a stochastic resonance-type phenomenon is observed in the diffusion coefficient when the particle moves under the presence of both an external field and internal disorder. This has resulted in a maximum value for the effective diffusion constant as a function of field strength and the time periodicity in the barriers. It is important to mention that in the presence of only the external field, a decreasing effective diffusion constant with increasing field strength is observed and that in the presence of only the barriers, a decreasing effective diffusion constant with increasing time periodicity in the barriers is also observed. This simple model resembles many physical and biophysical phenomena, in particular, the permeation of ions through ion channels.